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ABSTRACT

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Expectancy Differences Between Males and Females in the Performance of Preselected and Constrained Movements

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Running head: Expectancy Differences in Movement

Abstract

Performance differences and differences in expectancies of success between men and women were examined relative to the replication of preselected and constrained movements. No performance differences were found between the sexes, but preselected movements were reproduced more accurately than constrained movements. Persons who made preselected movements also expected to replicate those movements better than their constrained counterparts while males evidenced higher expectancies than females with respect to the replication movement. However, no differences were found in ratings of future expectancies after the subjects were informed that the reproduction accuracy of their initial performances was similar. The results were discussed in terms of a cognitive interpretation of the preselection effect, and the cultural stereotype of women in achievement settings, as well as how the acknowledgement of a good female performance can lead women to elevate their future expectancies of success.

Expectancy Differences Between Males and Females in the Performance of Preselected and Constrained Movements

The finding that voluntary, active movements are reproduced more accurately from motor short-term memory than are constrained movements, termed the preselection effect, has been considered to be almost ubiquitous (Kelso & Wallace, in press). The phenomenon of preselection has been explained by Kelso and Wallace as being the result of a superior mental image that is associated with voluntary movements. The image is essentially a representation of the completed action, i.e., the movement goal, and it only accompanies preselected movements because these are cognitively chosen by the performer. In contrast, the constrained mover is unaware of the movement parameters and the movement goal until the action is terminated by an external barrier. Thus, no goal image is available to this performer until the act is completed.

The preselected image is the internal representation of the intended movement. A person who selects and decides how far, how fast, and how and when to terminate a movement should expect to do well if that movement had to be replicated, moreso than a person who had no knowledge of the parameters of the movement. In other words,

persons who make preselected movements should expect to replicate those movements more accurately than subjects who make constrained movements. Gerson (Note 1) found support for this hypothesis as subjects who made preselected movements were not only more accurate in their reproduction responses, but they also evidenced a greater expectancy to successfully replicate their performances when compared to their constrained counterparts.

Gerson (Note 1) discussed these results by extending the motor-image explanation of the preselection effect to include the formation of cognitive expectancies of success. Drawing from the cognitive motivational literature, Gerson described the motor performance results as due to persons with higher expectancies usually outperform persons with lower expectancies (cf. Feather, 1966; Tyler, 1958). It was concluded that expectancy levels directly affected performance outcomes, thereby exerting an influence on the preselection effect.

Although Gerson (Note 1) used male and female subjects in the study, no examination was made of the possible differences that might have existed between sexes in relation to expectancy levels and subsequent performance, even though there was a brief mention of this possibility. While performance differences between men and women have not been found in previous

investigations of the preselection effect (Gerson, Note 2), it was probable that gender differences in expectancies of success related to a motor task did exist. This assumption was predicated on the findings of many studies in the verbal literature where it has been shown that differential expectations existed between males and females with respect to performance on a task (see Frieze, 1975, for a review).

Perhaps two possible reasons exist for the differences in expectancies exhibited between men and women. First, women are expected to perform at lower levels than men (Frieze, Fisher, Hanusa, McHugh, & Valle, in press), and this socialization stigma has caused the low expectancy cycle of females to become self-perpetuating. Since women were never expected to achieve by the society that defined their roles, the women did not see themselves as capable. This was evidenced by the attributional pattern of females, as they believed success was due to external factors (Frieze, 1975). The external attributions, in turn, led to lower expectancies of success relative to future performances. Thus, it seemed that the cultural stereotype led women into an attributional pattern that predisposed them to failure, or at least, to the belief that inferior performances must occur when compared to males.

The second reason for the differential expectancy estimates would be that women perceived tasks to be more difficult than male perceptions of the same tasks (Feldman-Summers & Kiesler, 1974). Combined with the traditional belief that as women they lacked the ability to succeed, their expectancy estimates were lower than those of men. Once again, lower expectancies would lead to inferior performances (Zajonc & Brickman, 1969). Therefore, the problem to be overcome is the indoctrination of women that they are less capable than men, and the associated low female estimates of expectancies of success. If women were shown that their performances approached or exceeded the performances of males, then the expectancy levels of women would begin to rise, and future female performances would occur at a high level of skill. As an example, one only has to note the swimming times of the present female Olympians and compare them to the achievements of the males in the same event several years ago to know that the discrepancies which once existed between male and female athletic performances are disappearing rapidly.

A possible way to elevate female expectancy estimates would be to inform the women that there was no difference in performance when compared to males. As actual performance differences disappear, cognitive

beliefs about those performances should also begin to undergo positive changes. In this study, it was hypothesized that there would be no performance differences between males and females during the performance of a movement reproduction task (cf. Gerson, Note 2). It was also hypothesized that there would be differences in initial expectancy formations relative to the performances of particular movements, with males evidencing higher estimates of success. However, after performance results were known, and no differences existed, estimates of future expectancies of success would not differ between males and females.

Methods

Subjects

Male (N = 30) and female (N = 30) volunteers from undergraduate physical education and psychology classes at Florida State University participated to fulfill a course requirement (M age = 20.98 yrs., SD = 1.33). Treatment conditions were assigned to the subjects with the restriction that a preselected movement was always assigned prior to a constrained movement. This yoking procedure was done to ensure that the movements were of equal length, and that the sensory consequences of the movements within each group were similar. There was an

equal number of males and females in each group.

Apparatus

The task was a curvilinear repositioning device in which the subject rotated a pointer through an arc of 200°. This apparatus has been described in greater detail elsewhere (Gerson & Thomas, 1977).

Procedure

Subjects entered the test area and sat down with the apparatus in full frontal view. Each person's right shoulder was aligned with the starting position of the pointer (0°), so the pointer would be rotated with the right hand in an arc from right to left. The right elbow was secured in an elbow rest for each movement, and the pointer was held in the fingertips to ensure that the movement was made about the wrist joint. Subjects were then blindfolded and a screen was lowered in front of the apparatus to obscure any visual cues. Auditory cues were controlled by the near-frictionless movement of the pointer.

Subjects received commands specific to the type of movement they made. Preselected subjects were instructed to remember the importance of preselection, to move in a slow but continuous manner, and not to choose the same criterion movement more than once during the testing session. The commands were presented verbally by the

experimenter at 2 sec intervals prior to each trial.

For preselected movements, subjects were told to covertly select a movement. The command sequence then proceeded as follows: "Grasp, Move, Release (after the subject held the pointer at the terminal position for 2 sec), Regrasp (after the experimenter returned the pointer to the start position), and Replicate." Upon completion of the replication movement, the subject was told to release the handle and to return the right hand to a resting position on the table. The experimenter returned the pointer to the start position. This constituted a trial, and the intertrial interval was 5 sec as determined with a hand-held Meylan 30-sec stopwatch.

Constrained subjects received the same sequence of commands, but they were not told to select a movement. Their movements were terminated by a mechanical stop placed in the apparatus by the experimenter at the same point the corresponding preselected subject stopped the chosen movement. This was done so that all distance and location cues for the preselected and constrained movements would be the same.

Subjects received 3 trials, and accuracy was measured in terms of the absolute deviation from the target, regardless of direction, and this is termed absolute error. Before the replication phase of each trial,

subjects were asked to verbally report, in percentages, their expectancies of successfully reproducing the criterion movement. These reports were recorded by the experimenter. Following the completion of each trial, subjects were informed as to the accuracy of their response. The subjects were then asked to verbally report a future expectancy of success as if they had to perform the movement again. However, no movement was actually performed after the second expectancy of success measure was taken.

Results

A 2 X 2 (movement type X gender) analysis of variance was conducted on the absolute error scores to determine the accuracy of preselected and constrained movements. The only significant effect was for movement type, F (1, 58) = 60.09, $p < .01$, with the preselected group (M = 2.39°) showing greater accuracy than the constrained group (M = 8.81°). This was interpreted as support for the preselection effect.

The same analysis was conducted on initial expectancies of success. No significant interaction was found, but there was a significant main effect for movement type, F (1, 58) = 14.71, $p < .01$, with the preselected group (M = 6.58) expecting to do better than the constrained

group (M = 4.67). There was also a significant main effect for gender, F (1, 58) = 4.64, $p < .05$, as males (M = 6.18) expected to successfully replicate the movement to a greater degree than the females (M = 5.31). When future expectancies of success were analyzed, no significant effects were found. The lack of a movement type effect in this analysis was attributed to the fact that subjects were not required to perform another movement. Therefore, they did not have distinct motor cues on which to base their judgments as future expectancies were taken relative to a hypothetical, but potential action. The lack of a significant gender effect was predicted for future expectancies when previous motor performances were found to be equivalent.

Discussion

The greater accuracy exhibited by subjects who made preselected movements over those who made constrained movements confirmed the results of previous investigations of the preselection effect (Gerson, Note 1, Note 2; Kelso, 1977a, 1977b). Additionally, in conjunction with previous findings (e.g., Gerson, Note 2), no performance differences were found between males and females on the limb repositioning task, although there were differences in expectancies of success

between movement types and gender groups, respectively.

The expectancy difference between the preselected and constrained movement groups replicated the findings of Gerson (Note 1) and these results were interpreted as further support for a cognitive expectancy explanation of the preselection effect. Apparently, there is a conscious motor image that accompanies a neural corollary discharge to the cortical centers of the brain that is activated only when a preselected movement is made. This motor image enables individuals making preselected movements to experience the behavior both cognitively and motorically, and subsequently, these people expect to replicate that movement more effectively than their constrained counterparts, for whom no motor image is available. However, the same result was not found for future expectancies of success.

There were no differences between movement groups when future expectancies were examined. Because the expectancy ratings were taken on a movement that might possibly be made, but never actually occurred, there were no motor cues on which to formulate the probability estimates. As such, subjective judgments had to serve as the basis for the expectancies of success. Thus, the lack of a difference between movement groups on future expectancies can be explained by the fact that no movement

was made that could be associated with these probability estimates. Additionally, the constrained group did not have to base their estimates on an inferior motor image which obviously had a detrimental influence on expectancy ratings in the initial performance situation.

To rate future expectancies, these subjects relied on their knowledge of what to do if the task were to be performed again and the outcome information they received for the previous movement to determine newer and higher probabilities of success. It should be remembered though, that if the task were to be performed again, accuracy differences would occur because of the generality of the preselection effect, even though expectancy differences between movement groups relative to the hypothetical second performance were not evidenced.

Although this finding might appear to be somewhat surprising, no theoretical basis existed from which predictive hypotheses could be formulated, and the explanations provided seem to be the most logical based on the facts. The outcome must now await further replication. In contrast, the hypothesis that there would be differences in initial expectancies between men and women did have a rational basis and it was supported. Males, in general, believed they would perform better, while females did not share that perception. In view of the

lack of a significant interaction, this difference must be due to a factor other than the actual motor performance. Perhaps one explanation could be the task itself. A limb repositioning task is a novel task to most people, particularly when performed in a laboratory. The task was movement oriented, but in no way was it considered traditionally feminine, as one might classify ballet. As such, females should not (cf. Frieze, 1975), and did not expect to do better than males. The cultural stereotype corollary to this is that since the task was not traditionally feminine, it was probably masculine. Women are not expected to achieve on masculine tasks! Therefore, the women probably viewed the task as being too difficult (Feldman-Summers & Kiesler, 1974), and, along with their seocialized belief that they lacked ability (Frieze, 1975), formulated expectancies that were lower than male expectancies.

Despite expectancy differences, a curious result was found pertaining to performance. Although women did not <u>expect</u> to do as well, they actually did evidence equivalent behaviors when compared to their male counterparts. After being informed of this fact, female expectancies were as high as male expectancies when both groups were told to assume the task would be performed again. The important point here is that although a

difference did exist on initial expectancies of success between men and women, there was no difference between genders on future expectancies of success after performances were shown to be equivalent. It was unnecessary to test futuer performances because it is already known that no accuracy differences exist between the sexes (cf. Gerson, Note 2). It is possible, then, that females who know their performances have equalled or exceeded similar performances by males, will begin to perceive their capabilities from a more positive perspective. This would lead to women raising their expectancies for success in any performance situation, regardless if the task is male or female oriented, and whether or not there are males participating in that task concurrently.

Reference Notes

1. Gerson, R. F. Preselection: A cognitive expectancy interpretation. Manuscript submitted for publication.
2. Gerson, R. F. Freeselection: An extension of the preselection effect. Manuscript submitted for publication.

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Footnotes

[1]This study constituted a portion of a doctoral dissertation that was submitted in partial fulfillment of the requirements for the Ph.D. degree, under the supervision of Dr. Robert N. Singer.